

REMARKS/ARGUMENTS

Favorable reconsideration of this application is respectfully requested.

Claims 1-4 are presently active in this case.

In the outstanding Office Action, Claim 1 was rejected under 35 USC §102(b) as being anticipated by Fukayama, EP 488,257); and Claims 2-4 were allowed.

Applicants acknowledge with appreciation the allowance Claims 2-4. Since Applicants consider that Claim 1 also defines allowable subject matter, the following comments traversing the outstanding rejection of Claim 1 are presented.

Briefly recapitulating, pending Claim 1 states:

1. A frequency converter which converts a first current signal having a first frequency into a second current signal having a second frequency different from the first frequency, comprising:

adding means for adding the first current signal and a reference current signal to output a third current signal; and

passing means for passing a larger current component of the third current signal to obtain the second current signal, when the third current signal includes the larger current component which is larger in magnitude than a threshold current, and blocking a smaller current component of the third current, when the third current signal includes the smaller current component which is smaller in magnitude than the threshold current.

Thus, Claim 1 defines a passing means which allows a signal current to pass through when the level of the signal current exceeds the level of the threshold current, and which blocks a signal current from passing through when the level of the signal current is below the level of the threshold current. It is clear that the claimed passing means, which in the example shown in Figure 2 includes the transistor 104 and the current source 106 which provides the threshold current defining the point at which current conduction of the transistor 104 occurs, requires operation based on a threshold current, e.g., $I_{th} = I_1$ in Figure 2. As claimed in Claim 1, the output I_o of the passing means is controlled by the level of the threshold current I_{th} . To meet the terms of Claim 1, therefore, the prior art must show a passing means, e.g., a transistor, having input thereto a threshold current which controls conduction by the

transistor. Note also the effect of such control operation shown in the illustrations of currents at the input and the output of the passing transistor 104. The bottom lower right waveform of the INPUT to the transistor 104 is the classic sum signal, whereas the upper waveform is the chopped output signal which is the upper portion of the INPUT signal after undergoing thresholding by virtue of the threshold current I_{th} .

The claimed invention in which a threshold current is used to block output of input below the current threshold is advantageous in that the power supply voltage of a circuit can be kept below a withstand voltage of a high-speed transistor, and that electric power consumption can be kept low.

In contrast, according to Fukuyama, a third transistor (Tr3) as passing means controls the signal level of a current signal obtained by combining a collector current of first transistor Tr1 and that of second transistor Tr2 in accordance with the bias voltage (V_{B3}) applied to the base, as shown in the attached exhibit. Assuming that the third transistor (Tr3) of Fukuyama serves as a "passing means," it is clear from the Fukuyama disclosure that there is no teaching of a current source 106 which generates a threshold current or generating or applying a threshold current to the transistor (Tr3) nor does Fukuyama provide any teaching of employing a threshold current to control whether or not current conduction or current blocking is to occur. On the contrary, it appears from the values of resistances and voltages identified in Fukuyama's Figures 7-8 that the transistor Tr3 continuously conducts current and performs no blocking function whatsoever. As a result, it is respectfully submitted that the output of Fukuyama transistor Tr3 has a waveform as shown in the lower right portion of Applicants' Figure 2, and not a chopped waveform as shown corresponding to OUTPUT I_o shown in Applicants' Figure 2.

In summary, Fukuyama fails to disclose a passing means utilizing a threshold current to control passing and blocking of an input signal supplied thereto. Merely because Fukuyama discloses as transistor Tr3 as a passing means is not dispositive of the question of controlling current passing/blocking, since Fukuyama does not disclose or suggest any current blocking function of the transistor Tr3, and does not disclose or suggest establishing any particular threshold current by which current passing/blocking of current at the emitter of transistor Tr3 occurs. Furthermore, such functionality is clearly not inherent by mere use of a transistor, as implied in the last paragraph at page 3 of the outstanding Office Action, but on the contrary is a function of the intelligent arrangement and biasing of a transistor, as disclosed and claimed by Applicants. Accordingly, it is respectfully submitted that Fukuyama clearly does not anticipate or render obvious the subject matter of Claim 1.

Consequently, in view of the above comments, it is respectfully submitted that the outstanding rejection of Claim 1 is traversed and that Claim 1 as well as Claims 2-4 is allowable. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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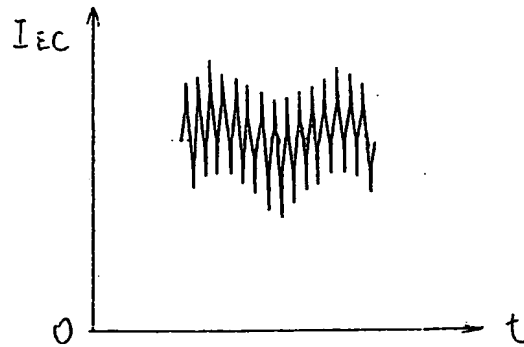


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